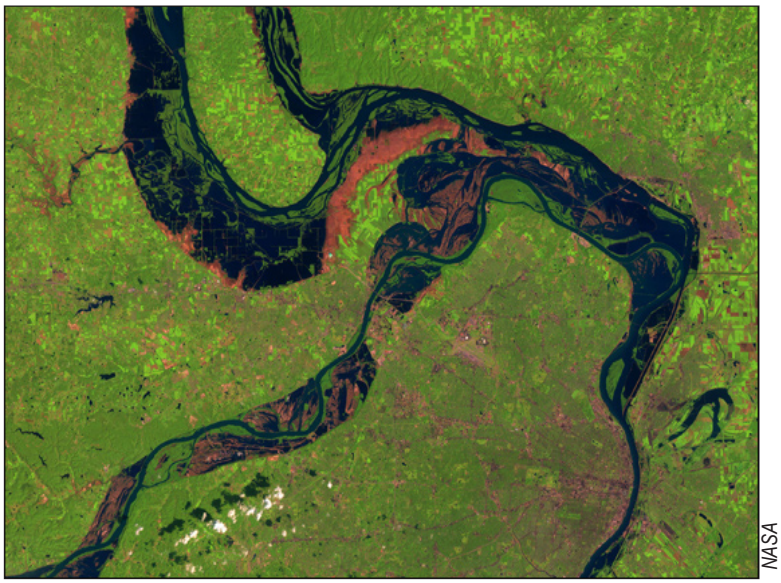
CLIMATE PROGRAM OFFICE

Explaining Climate to Improve Predictions

How can we make true comparisons among climate datasets that were generated with different inputs?

Can current climate science methods identify the causes of observed climate conditions and phenomena?



NASA

The reanalysis process and resulting datasets allowed scientists to identify climate factors that led to the devastating floods along the Mississippi River in 1993.

The Explaining Climate to Improve Predictions (ECIP) Program supports efforts to increase the level of detail in existing climate datasets. The program also provides support for researchers who connect observed climate events with their causes, providing 'attribution' for climate phenomena.

Objectives

NOAA's ECIP Program produces and delivers improved climate data products that facilitate accurate assessments of global climate variability, detection of climate change, and regional trends in climate extremes. The ECIP Program also provides attribution for outstanding climate events such as extreme global land temperatures and areas in the U.S. affected by drought.

Approaches

Uninterrupted climate observations are not available for all times and at every place on Earth, so scientists use models to "reanalyze" the existing data to fill in the gaps. The resulting reanalysis datasets have higher time and space resolutions than existing datasets.

The higher resolution of reanalyzed datasets improves scientists' abilities to attribute climate variations to their causes. In turn, the ability to connect the causes and effects of climate events increases the accuracy of climate models. Ultimately, increased model accuracy generates new information that can be used for further reanalysis of data. Today, scientists are making breakthroughs in climate model accuracy and increasing model resolution. Such advancements improve scientists' understanding of past climates, leading to improved predictions of future climate.

With support from the ECIP Program, the National Center for Environmental Prediction (NCEP) is currently generatating a reanalysis dataset that will document year-to-year climate conditions at a spatial scale of about 40 km anywhere on the globe—an improvement of more than 600 percent over the previous reanalysis. The National Climatic Data Center will provide the output of this reanalysis to the climate science community. Another project, conducted by NOAA's Earth System Research Laboratory (ESRL), is reanalyzing daily-averaged surface pressure measurements from the late 1800s to the present. This product will provide pressure records for studies of decadal variability and some aspects of climate change. ESRL and NCEP also partner with ECIP to produce near-real-time attribution data for climate impacts of El Niño/La Niña in the United States; these include extreme events such as tornadoes, hurricanes, drought, and cold waves.

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